

Name(s) of Risk Team Members: P. Cirnigliaro, A. Etkin, R. Karol, E. Lessard, J. Maraviglia, D. Passarello, A. Piper, R. Savage, J. Scott, M. Van Essendelft			Point Value → Parameter ↓		1		2		3		4		5		
Area/Facility Description Title: Collider-Accelerator Area/Facility # (if applicable): Area-Wide FRA 21			Occupancy or Use		≤once/year		≤once/month		≤once/week		≤once/shift		>once/shift		
Area/Facility Description: Building 939 E-Cooler Test Area-Wide			Severity		First Aid Only		Medical Treatment		Lost Time		Partial Disability		Death or Permanent Disability		
			Likelihood		Impossible		Unlikely		Possible		Probable		Multiple		
Approved by: <i>E. Lessard</i> Date: 7/20/04 Rev.#: 1															
Reason for Revision (if applicable): FRA number added. Uniform hazard nomenclature added.									Comments:						
					Before Additional Controls							After Additional Controls			
Physical Item or Activity	Hazard(s)	Control(s)	Occupancy A	Severity B	Likelihood C	Risk* AxBxC	Control(s) Added to Reduce Risk				Occupancy A	Severity B	Likelihood C	Risk* AxBxC	% Risk Reduction
Primary Beam	High hazard ionizing radiation	ACS; PASS; postings; crash buttons and chords; C-AD area classification; shielding; dosimetry; training; RSC reviews	4	2	2	16									
General area radiation Residual radiation, external	Ionizing radiation	Postings, training, shielding, RCD surveys, RCD oversight, RWP, work planning	5	1	2	10									
Electrical Equipment & Power Supplies BNL Class A & B <250 VAC; <1000Vdc	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; disconnected cable policy; installations comply with applicable codes; procedures; training; distribution drawings; LOTO; Kirk keys; working hot permits; ASSRC/ESRC reviews; qualified electricians and technicians; cabinet interlocks; postings; locked areas; guarding; work planning; GFCI; grounding standards; emergency procedures	5	4	2	40									
Electrical Equipment & Power Supplies BNL Class C <600 VAC; <6000 VDC	Arc blast; burn	Procedures, training, PPE	5	5	2	50									
Electrical Equipment & Power Supplies BNL Class C <600 VAC; <6000 VDC	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; disconnected cable policy; installations comply with applicable codes; procedures; training; distribution drawings; LOTO; Kirk keys; working hot permits; ASSRC/ESRC reviews; qualified electricians and technicians; cabinet interlocks; postings; locked areas; guarding; work planning; GFCI; grounding standards; emergency procedures; two-person rule for hot work	5	5	2	50									
Electrical Disconnects And Switches	Arc blast; burn	Procedures, training, PPE	3	5	2	30									

Material Handling	Being struck by an object, such as from improperly secured material	Work planning; equipment specific training; work area barricades and controls; PPE; clamps; straps; vices; fixtures	3	3	3	27						
Chemical Handling	Eye exposure	Procedures; compliance with regulations; training; CMS inventory; MSDS; volume controls; PPE as required; locked or controlled areas; postings; labeling; proper containers; segregation; proper spill cleanup equipment available; Tier 1 inspections	2	2	2	8						
Chemicals	Inhalation exposure	Procedures; compliance with regulations; training; CMS inventory; MSDS; volume controls; PPE as required; locked or controlled areas; postings; labeling; proper containers; segregation; proper spill cleanup equipment available; Tier 1 inspections	2	2	2	8						
Chemicals	Fire; explosions	Procedures; compliance with regulations; training; CMS inventory; MSDS; volume controls; PPE as required; locked or controlled areas; postings; labeling; proper containers; segregation; proper spill cleanup equipment available; Tier 1 inspections	2	2	2	8						
Manual Material Handling	Overexertion – injuries caused by excessive lifting, pushing, pulling, holding, carrying or throwing of an object	Gloves; hardhat; handcarts; dollies; training; safety shoes; ergonomic reviews of work, effective supervision at the job site	3	2	3	18						
Manual Material Handling	Bodily reaction – injuries resulting from bending, climbing, loss of balance and slipping without falling	Use of dollies to eliminate manual material handling tasks, use of portable lighting to increase visibility at job site, ergonomic reviews of work, effective supervision at the job site, training	3	2	3	18						
Use Of Hand Tools	Being struck by an object, such as flying chips	PPE; training; maintenance; Tier 1 inspections; UL listed equipment; pre-inspections	3	2	2	12						
Use Of Hand Tools	Being struck against an object, such as sharp surfaces	PPE; training; guarding	3	2	2	12						
Use Of Hand Tools	Being struck by an object, such rotating parts	Equipment specific training; guarding; PPE; postings	3	2	2	12						
Walking – Working Surfaces	Falls on same level	PPE; Tier 1; work planning; P.E. scheduled maintenance; internal and external audits; posting; labeling; training; barriers; communication; lessons learned	5	4	3	60	C-A staff was asked to identify outside walking/working surfaces that are in need of repair. PE instituted a program to correct deficiencies. Snow shovels and salt were distributed to staff and users for emergency use on walkways in winter storms. A safety checklist: Walking and Working Surfaces was distributed to staff. C-A O.P.M. 2.28.d was updated to indicate that work performed with risk factors of slipping and falling shall be classified at a minimum as a moderate hazard job and will require additional review and an Enhance Work Permit.	5	4	2	40	50%
Walking Surfaces	Falls on same level from uneven walkways	Maintenance of walkways and landings	5	3	3	45						

Working Environment	Poor air quality; mold	HVAC; facility maintenance; Tier 1 inspections	5	2	2	20					
Tours	Ionizing radiation exposure	Postings; trained escorts; RCD concurrence to enter radiation areas; RWP; work planning; training waiver; red TLD; BNL minors policy	2	1	2	4					
Transformer And Switch Yards	Shock or electrocution	All equipment is listed or reviewed by CEE; Tier 1 inspections; installations comply with applicable codes; procedures; training; LOTO; qualified electricians; postings; locked areas; work planning; grounding standards; emergency procedures; grounding before work start	2	5	2	20					
Transformer And Switch Yards	Arc blast	PPE; procedures; training; qualified electricians	2	5	2	20					
Limited access areas	Impaired egress	Tier 1; work planning; skill of craft; P.E. scheduled maintenance; internal and external audits; posting; labeling; training; barriers; communication; internal processes; lessons learned; life safety codes; emergency preparedness	2	1	3	6					
Cryogenic	Being struck by an object due to a pressure release	Postings; maintenance; training; work planning; LOTO; Cryogenic Safety Committee /ASSRC reviews; procedures; PPE; interlock systems; Tier one inspection; pressure testing	4	2	2	16					
Cryogenic	Contact with temperature – extremes that result in such injuries as frost bite or burns	Postings; maintenance; training; work planning; LOTO; Cryogenic Safety Committee /ASSRC reviews; procedures; PPE; interlock systems; Tier 1 inspection	4	3	2	24					
Computer And Office Machine Usage	Repetitive motion	BNL SHSD ergonomic reviews; training; use of ergonomically designed equipment	5	3	3	45					
Batteries/UPS	Molten spray	PPE; procedures; training	3	4	3	36					
Batteries/UPS	Hydrogen gas explosion	PPE; procedures; training	3	3	2	18					
Lasers	Non-ionizing radiation	Barriers; interlock systems; postings; training; LSO review; work planning; PPE; procedures; Tier 1 inspections; warning systems	4	4	3	48					
Further Description of Controls Added to Reduce Risk:											
*Risk:	0 to 20	21 to 40	41-60				61 to 80			81 or greater	
	Negligible	Acceptable	Moderate				Substantial			Intolerable	